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(54) **Amplitude attenuation estimation and recovery systems for OFDM signals**

(57) This application relates to amplitude correction for orthogonal frequency division multiplexing signals received by a communication device. An amplitude attenuation estimation is performed for amplitude correction on received OFDM signals.

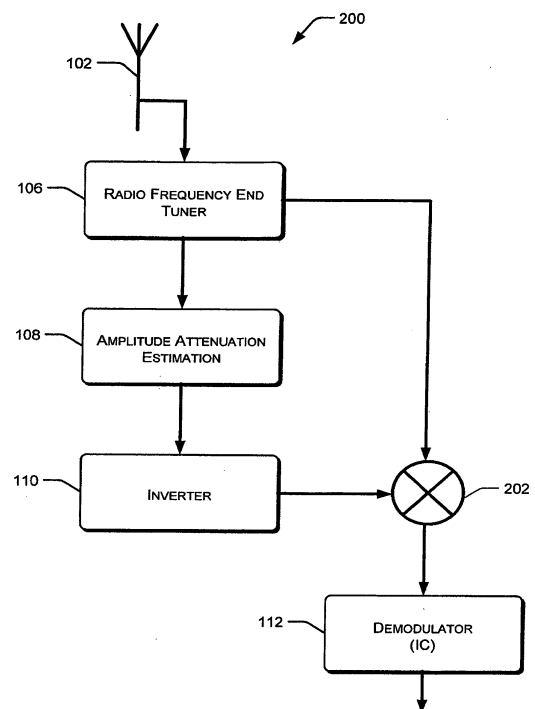


Fig. 2



EUROPEAN SEARCH REPORT

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EP 08 01 3363

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	XAVIER NIETO ET AL: "On the design of a broadband wireless MIMO-OFDM demonstrator", ANTENNAS AND PROPAGATION, 2006. EUCAP 2006. FIRST EUROPEAN CONFERENCE ON, IEEE, PISCATAWAY, NJ, USA, 6 November 2006 (2006-11-06), pages 1-8, XP031393475, DOI: 10.1109/EUCAP.2006.4584985 ISBN: 978-92-9092-937-6 * abstract; figures 2, 3 * * sections 1, 3.1.1, 3.1.2, 3.2 *	1	INV. H04L27/26 H04L27/38
X	US 2004/218520 A1 (AIZAWA MASAMI [JP]) 4 November 2004 (2004-11-04) * abstract; figure 1 * * paragraph [0006] * * paragraph [0033] * * paragraph [0043] * * paragraph [0051] *	1	
X	EP 1 548 958 A2 (TOSHIBA KK [JP]) 29 June 2005 (2005-06-29) * abstract; figures 3, 4 * * paragraph [0002] * * paragraph [0025] - paragraph [0027] * * paragraph [0038] - paragraph [0040] * * paragraph [0073] - paragraph [0074] *	1	TECHNICAL FIELDS SEARCHED (IPC) H04L
X	US 2002/090042 A1 (HEINONEN JARI M [US] ET AL) 11 July 2002 (2002-07-11) * abstract; claim 18; figures 2, 3 * * paragraph [0005] - paragraph [0007] * * paragraph [0048] - paragraph [0050] *	1,2,4	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 May 2017	Examiner Faber, Thomas
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2004/071237 A1 (WAKIMOTO HIROSHI [JP] ET AL) 15 April 2004 (2004-04-15) * abstract; claim 4; figures 2-4 * * paragraph [0007] - paragraph [0010] * * paragraph [0015] * * paragraph [0035] *	1,2,4	TECHNICAL FIELDS SEARCHED (IPC)
X	US 2007/009011 A1 (COULSON ALAN J [NZ]) 11 January 2007 (2007-01-11) * abstract; figures 2A, 3 * * paragraph [0005] - paragraph [0011] * * paragraph [0057] * * paragraph [0062] * * paragraph [0070] - paragraph [0071] * * paragraph [0077] - paragraph [0084] * * paragraph [0089] *	1,3,5	
X	US 2007/030002 A1 (FREI MARK G [US] ET AL) 8 February 2007 (2007-02-08) * abstract; claim 25 * * paragraph [0007] * * paragraph [0022] - paragraph [0026] * * paragraph [0033] - paragraph [0034] * * paragraph [0083] *	1,3,5	
X	US 2004/165656 A1 (SHIUE DONG-CHANG [US] ET AL) 26 August 2004 (2004-08-26) * figures 4A, 8 * * paragraph [0030] - paragraph [0038] * * paragraph [0047] * * paragraph [0070] *	6-14	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 May 2017	Examiner Faber, Thomas
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	ASHIKHMIN ALEXEI ET AL: "Design and development of a terrestrial digital video broadcast demodulation core: An international collaborative effort", BELL LABS TECHNICAL JOURNAL, WILEY, CA, US, vol. 12, no. 2, 1 July 2007 (2007-07-01), pages 97-118, XP011627968, ISSN: 1089-7089, DOI: 10.1002/BLTJ.20239 [retrieved on 2014-03-15] * figures 1, 2, 4 * * page 98, right-hand column * * page 101, left-hand column - page 103, left-hand column * * page 105, right-hand column - page 107, right-hand column *	6-14	
X	EP 1 821 480 A1 (SONY DEUTSCHLAND GMBH [DE]) 22 August 2007 (2007-08-22) * abstract; figure 2 * * paragraph [0008] - paragraph [0011] * * paragraph [0018] - paragraph [0025] *	15-20	TECHNICAL FIELDS SEARCHED (IPC)
X	US 2005/078776 A1 (SONG YUN-JEONG [KR] ET AL) 14 April 2005 (2005-04-14) * abstract; figures 2, 3 * * paragraph [0003] * * paragraph [0016] * * paragraph [0027] - paragraph [0041] *	15-20	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 May 2017	Examiner Faber, Thomas
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1, 2, 4

Amplitude correction based on one signal distortion or multi-signal distortion.

2. claims: 1, 3, 5

Using Hilbert-Huang Transform (HHT) and DFT filter banks.

3. claims: 6-14

Segmenting samples into groups and curve fitting samples.

4. claims: 15-20

Obtaining an envelope of amplitude distortion considering a-priori info and phase/time offsets.

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ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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35

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45

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2004218520	A1	04-11-2004	CN 1521970 A	18-08-2004
			JP 3740471 B2	01-02-2006
			JP 2004247945 A	02-09-2004
			US 2004218520 A1	04-11-2004

EP 1548958	A2	29-06-2005	CN 1638368 A	13-07-2005
			EP 1548958 A2	29-06-2005
			EP 2538576 A1	26-12-2012
			EP 2538577 A1	26-12-2012
			JP 4212548 B2	21-01-2009
			JP 2005210690 A	04-08-2005
			US 2005163081 A1	28-07-2005
			US 2009028271 A1	29-01-2009
			US 2009279618 A1	12-11-2009
			US 2009304107 A1	10-12-2009
			US 2010111203 A1	06-05-2010
			US 2011142023 A1	16-06-2011
			US 2012155452 A1	21-06-2012

US 2002090042	A1	11-07-2002	US 6363127 B1	26-03-2002
			US 2002090042 A1	11-07-2002
			US 2003194029 A1	16-10-2003
			WO 0079748 A1	28-12-2000

US 2004071237	A1	15-04-2004	JP 3959320 B2	15-08-2007
			JP 2004088221 A	18-03-2004
			US 2004071237 A1	15-04-2004

US 2007009011	A1	11-01-2007	NZ 526669 A	31-03-2006
			US 2007009011 A1	11-01-2007
			WO 2004114617 A1	29-12-2004

US 2007030002	A1	08-02-2007	EP 1579608 A2	28-09-2005
			US 7966156 B1	21-06-2011
			US 2004078160 A1	22-04-2004
			US 2007030002 A1	08-02-2007
			WO 2004034231 A2	22-04-2004

US 2004165656	A1	26-08-2004	AU 2003300419 A1	17-09-2004
			US 2004165656 A1	26-08-2004
			WO 2004077779 A1	10-09-2004

EP 1821480	A1	22-08-2007	DE 60037583 T2	08-01-2009
			EP 1182817 A1	27-02-2002
			EP 1821480 A1	22-08-2007
			EP 2031788 A1	04-03-2009

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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17-05-2017

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		EP 2256979 A2	01-12-2010
		EP 2755344 A2	16-07-2014
		HK 1123903 A1	17-08-2012
		JP 4986349 B2	25-07-2012
		JP 5100547 B2	19-12-2012
		JP 5847664 B2	27-01-2016
		JP 2002135228 A	10-05-2002
		JP 2008271602 A	06-11-2008
		JP 2012253796 A	20-12-2012
		US 2002097668 A1	25-07-2002
		US 2006028977 A1	09-02-2006
		US 2007064825 A1	22-03-2007
		US 2010039924 A1	18-02-2010
		US 2010074377 A1	25-03-2010
		US 2011211654 A1	01-09-2011
		US 2014037021 A1	06-02-2014
		US 2014037022 A1	06-02-2014

US 2005078776 A1	14-04-2005	KR 20050034472 A	14-04-2005
		US 2005078776 A1	14-04-2005

EPO FORM P0459

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